

DRAWING SCALE: 1:350,000

THE HASHEMITE KINGDOM OF JORDAN  
MINISTRY OF WATER AND IRRIGATION  
WATER AUTHORITY



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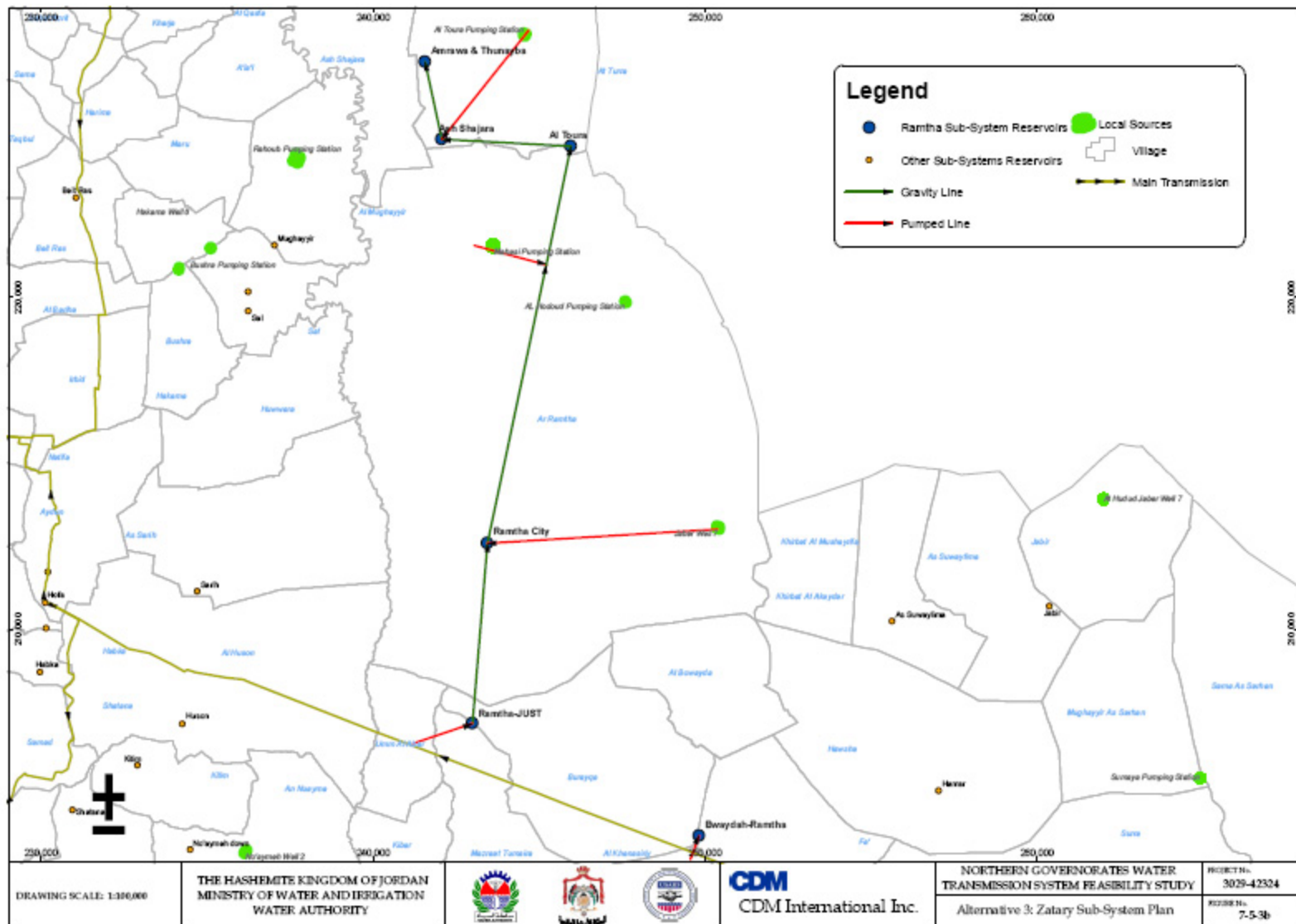
CDM International Inc.

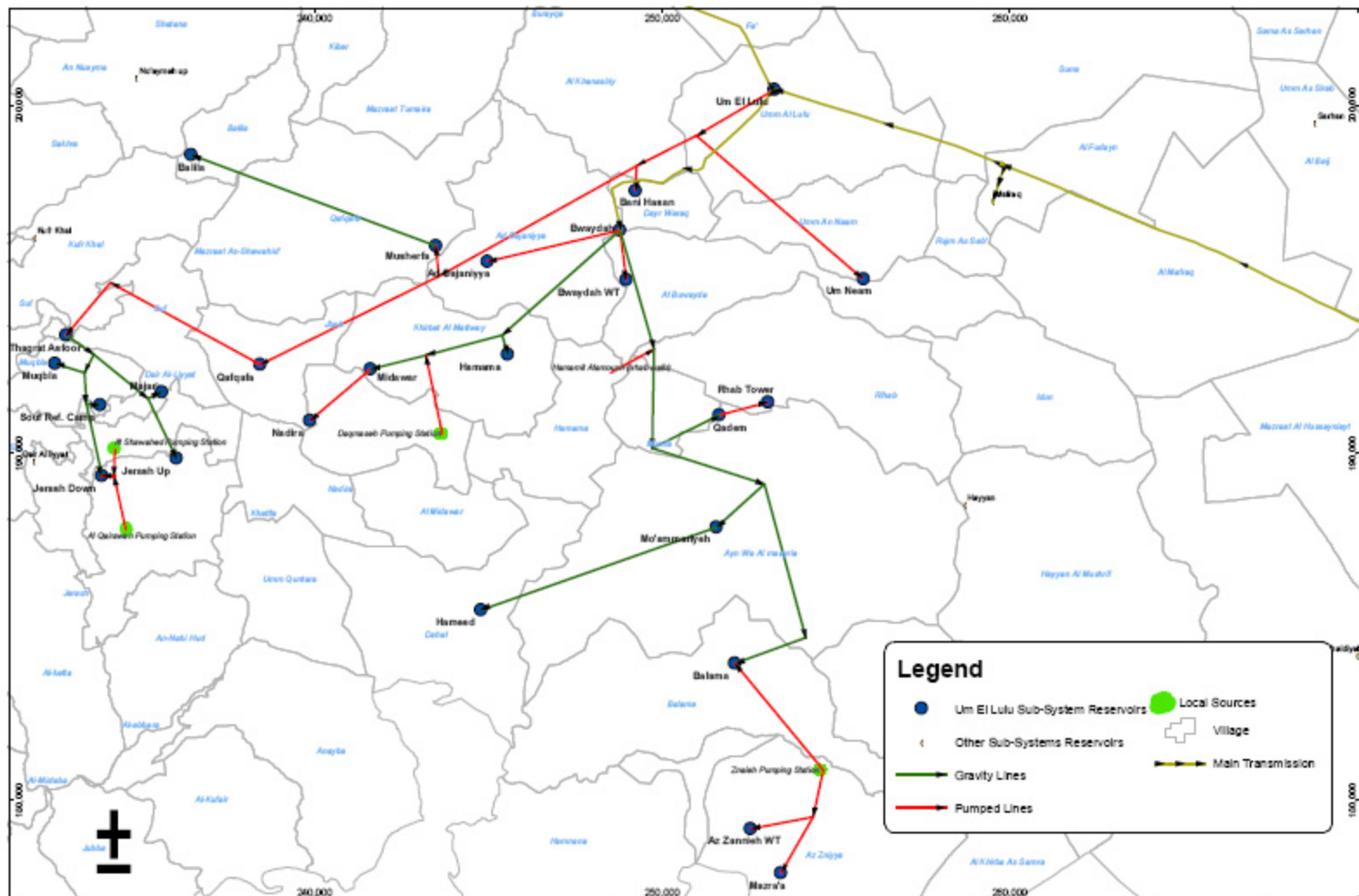
NORTHERN GOVERNORATES WATER  
TRANSMISSION SYSTEM FEASIBILITY STUDY

Alternative 3: Zatory Sub-System Plan

PROJECT No.  
3029-42324

REVISION  
7-5-3a





DRAWING SCALE: 1:100,000

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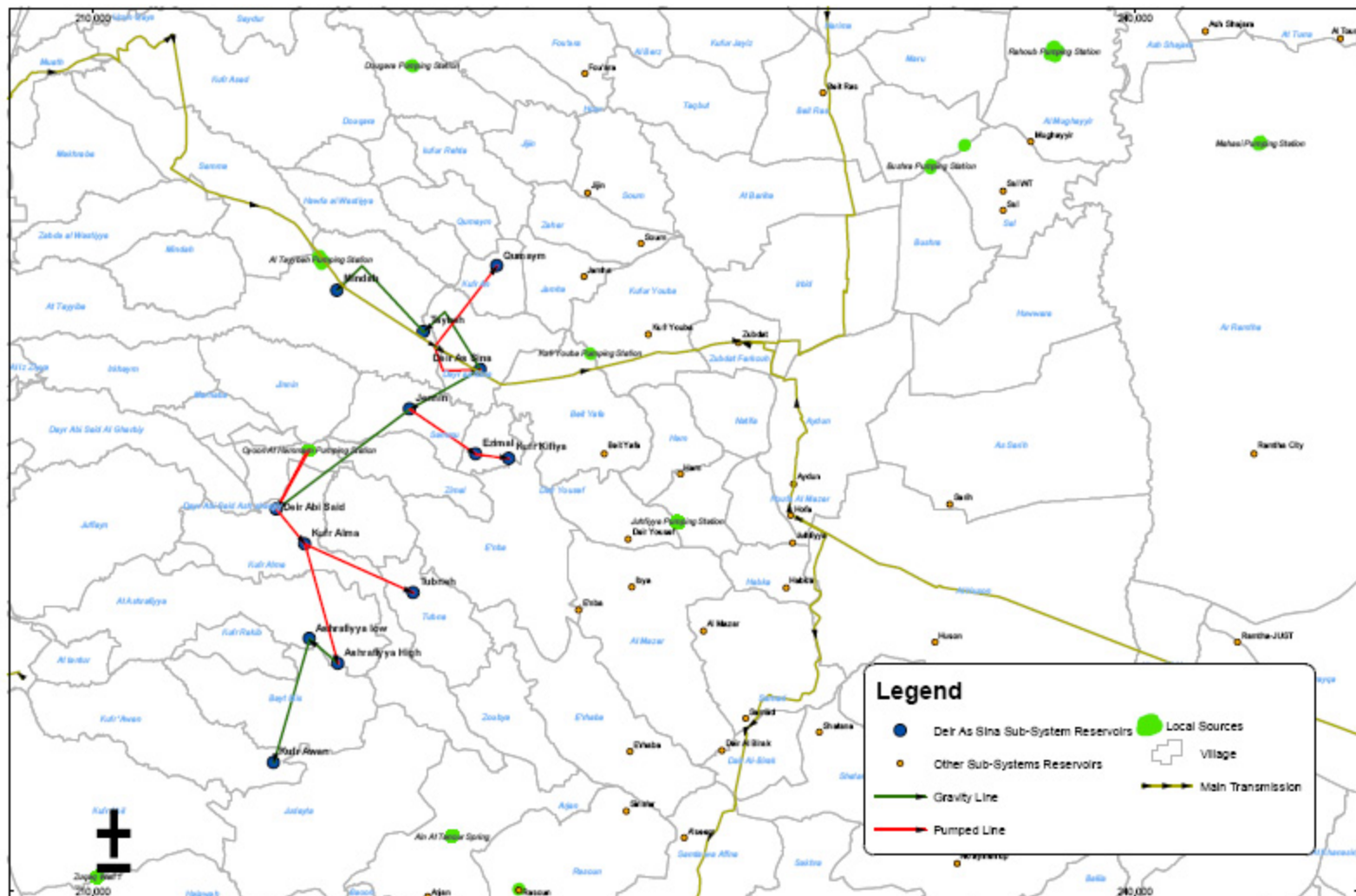
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TRANSMISSION SYSTEM FEASIBILITY STUDY

Alternative 3: Um El-Lulu  
Sub-System Plan

PROJECT No.  
3029-42324

REVISION No.  
7-5-3c



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TRANSMISSION SYSTEM FEASIBILITY STUDY

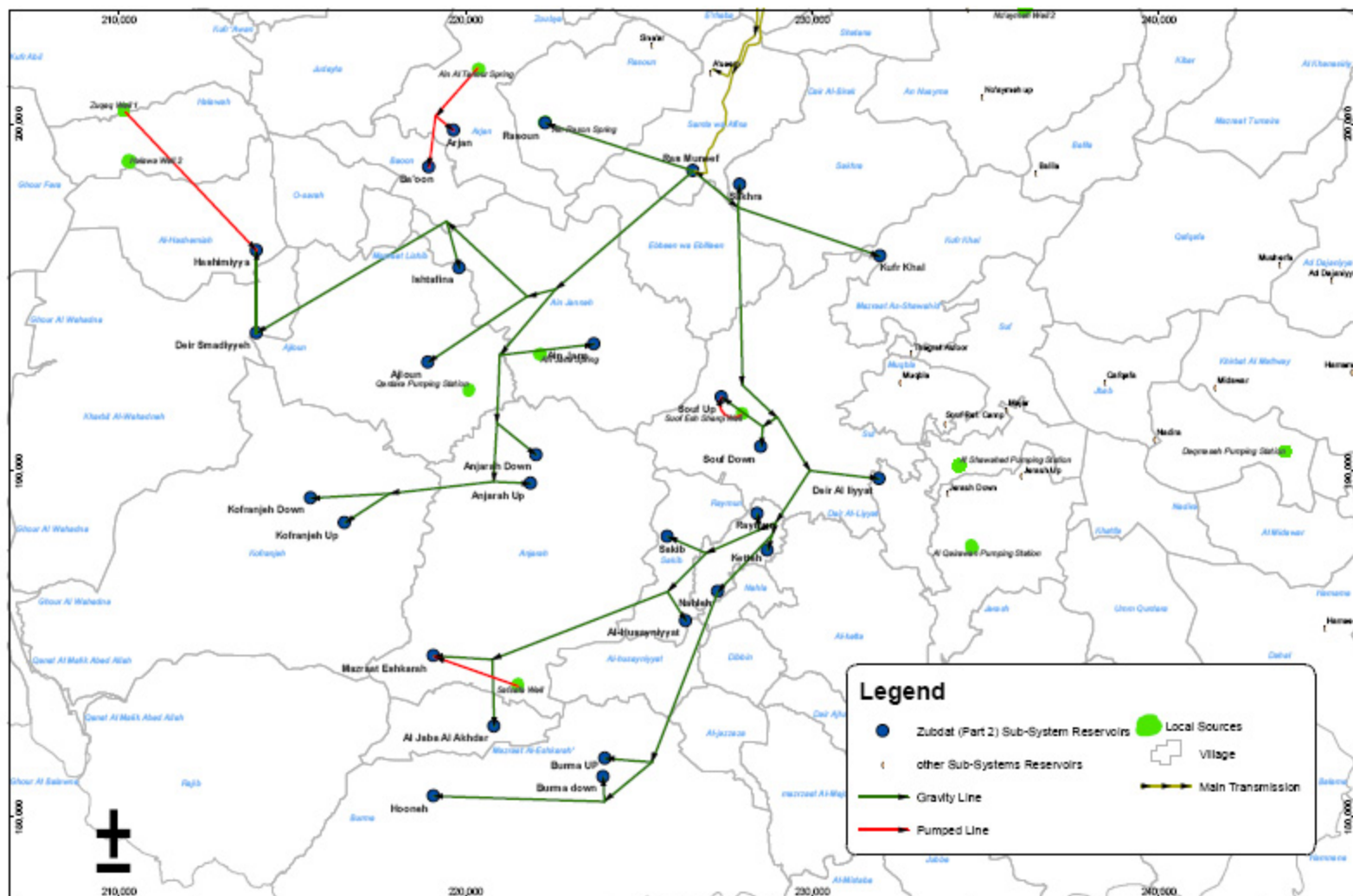
Alternative 3: Dair As Sina Sub-System Plan

PROJECT No:  
3029-42304

REVISION No:  
7-5-3d







DRAWING SCALE: 1:300,000

THE HASHEMITE KINGDOM OF JORDAN  
MINISTRY OF WATER AND IRRIGATION  
WATER AUTHORITY

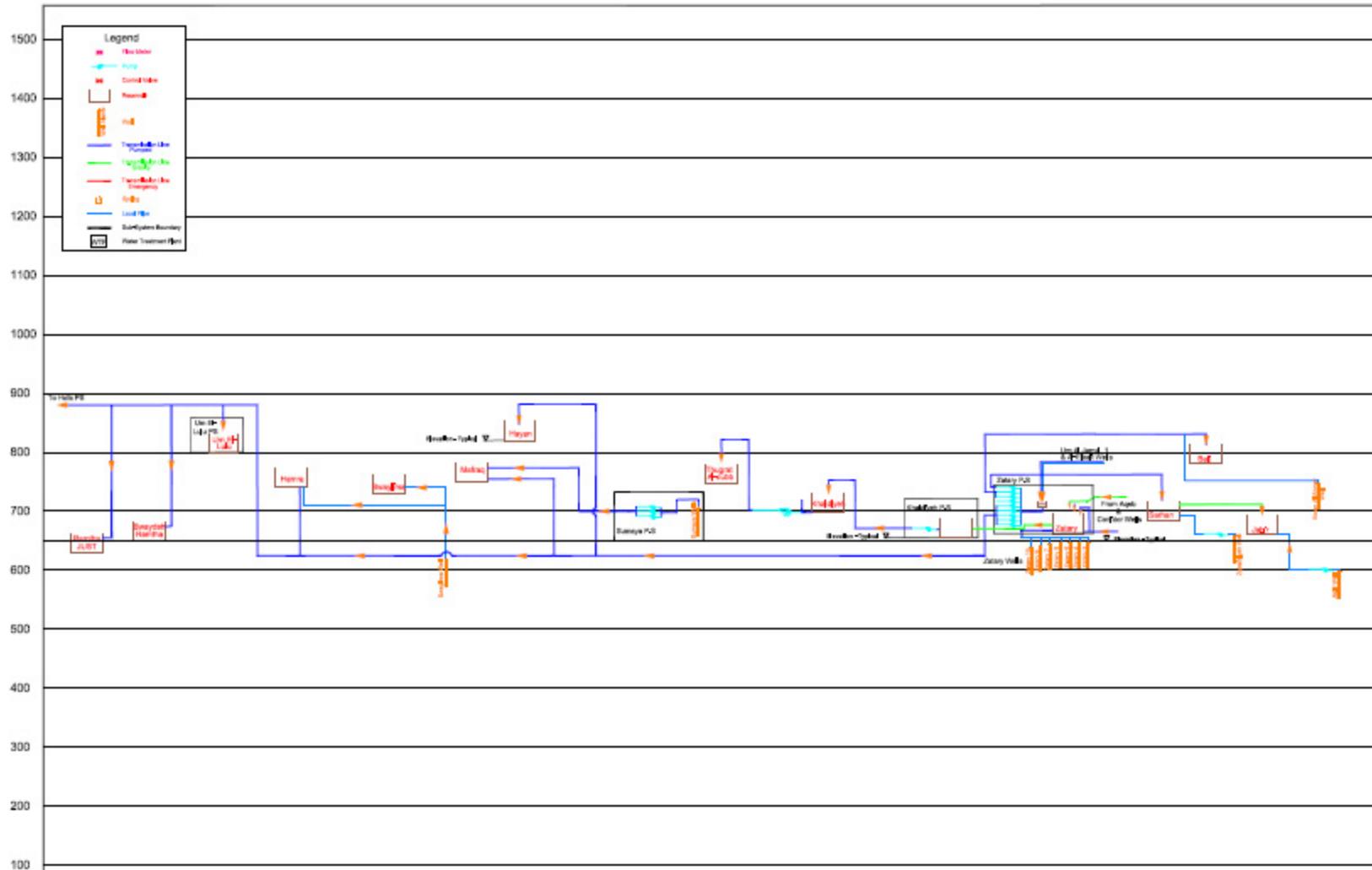


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NORTHERN GOVERNORATES WATER  
TRANSMISSION SYSTEM FEASIBILITY STUDY  
Alternative 3: Zubdat (Part 2)  
Sub-System Plan

PROJECT No:  
3029-42304  
REVISION No:  
7-5-3f



NOT TO SCALE

THE HASHEMITE KINGDOM OF JORDAN  
MINISTRY OF WATER AND IRRIGATION  
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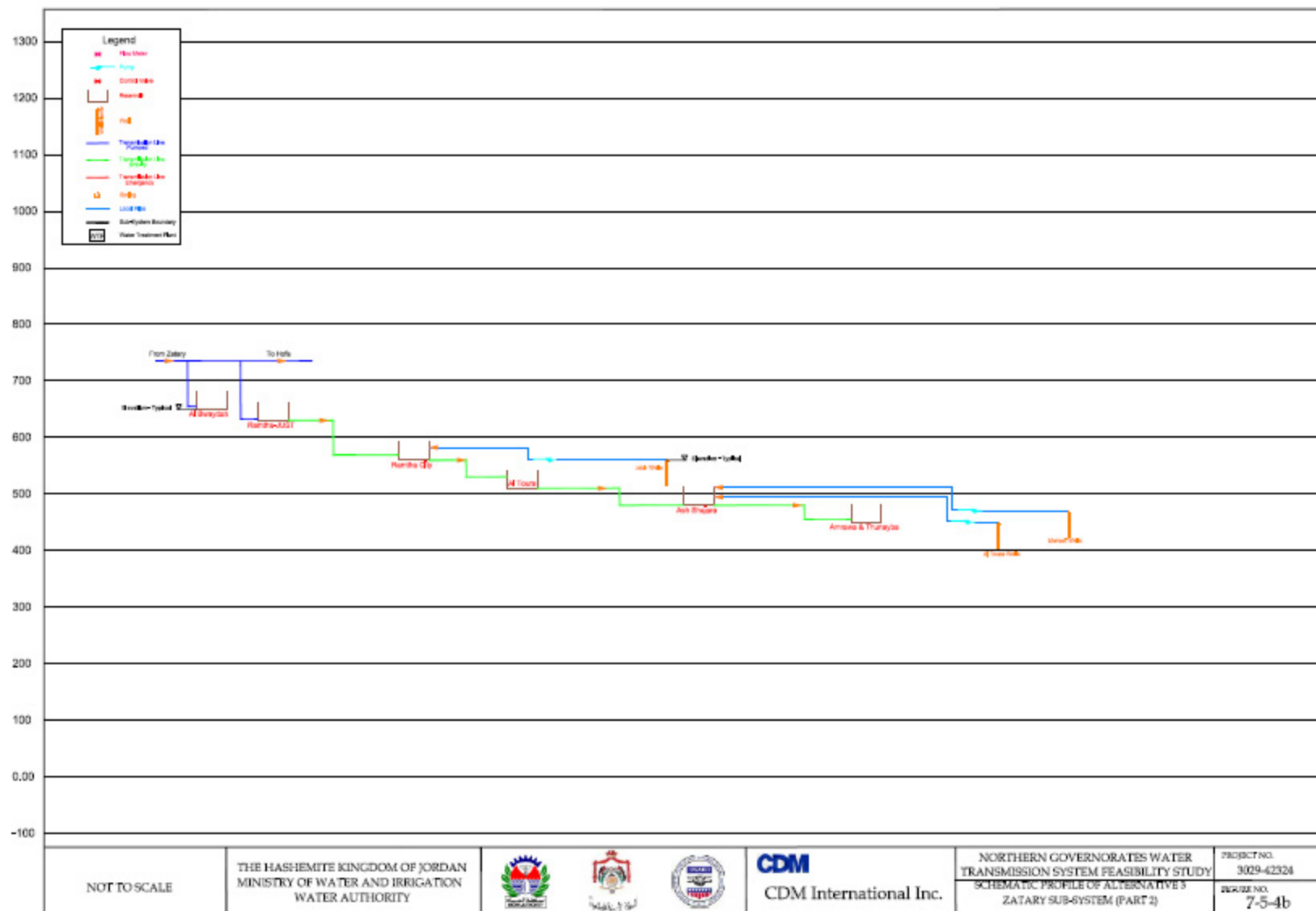
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NORTHERN GOVERNORATES WATER  
TRANSMISSION SYSTEM FEASIBILITY STUDY

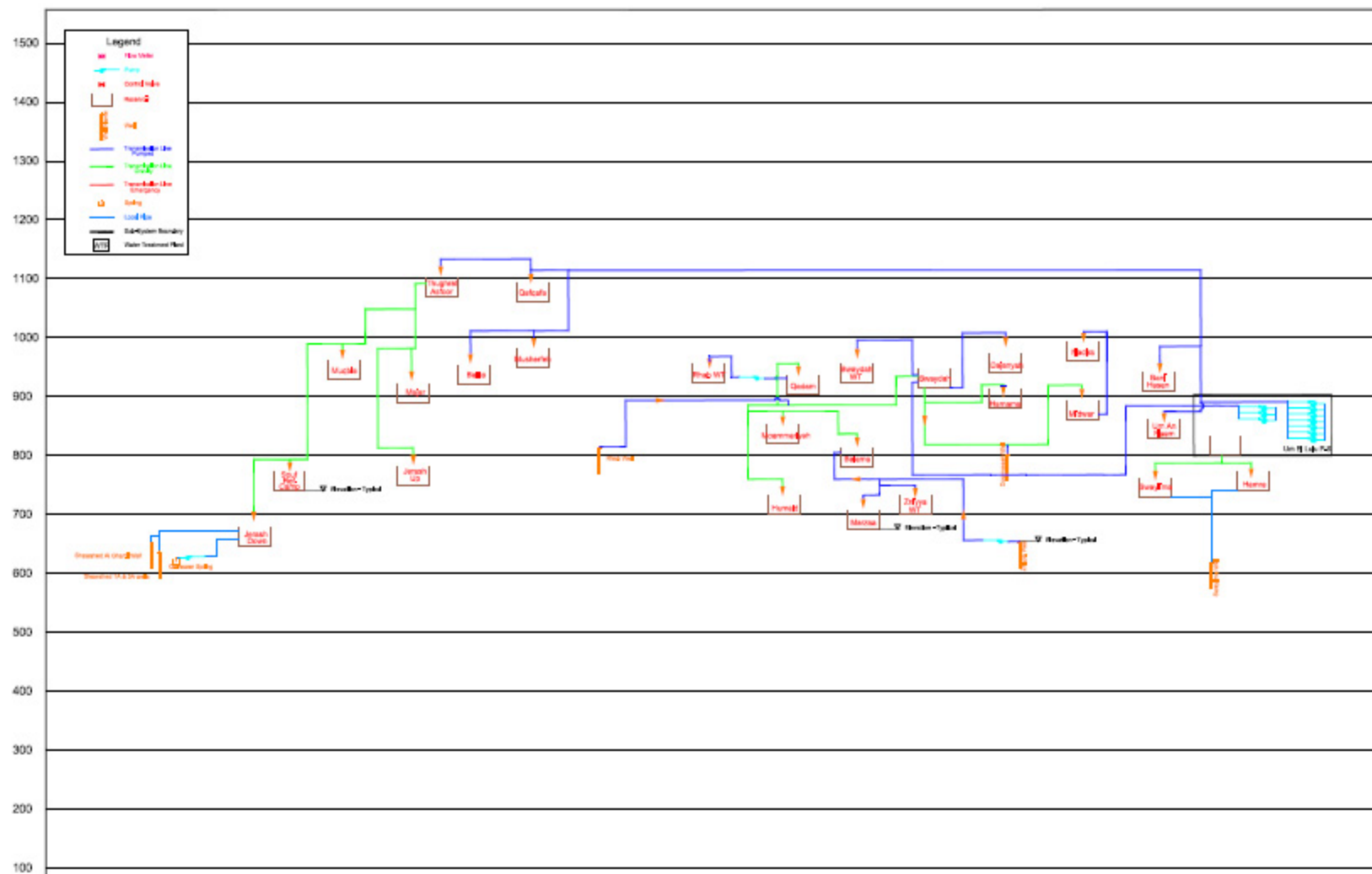
SCHEMATIC PROFILE OF ALTERNATIVE 3  
ZATORY SUB-SYSTEM (PART 1)

PROJECT NO.  
3029-42324

REVISION NO.  
7-5-4a







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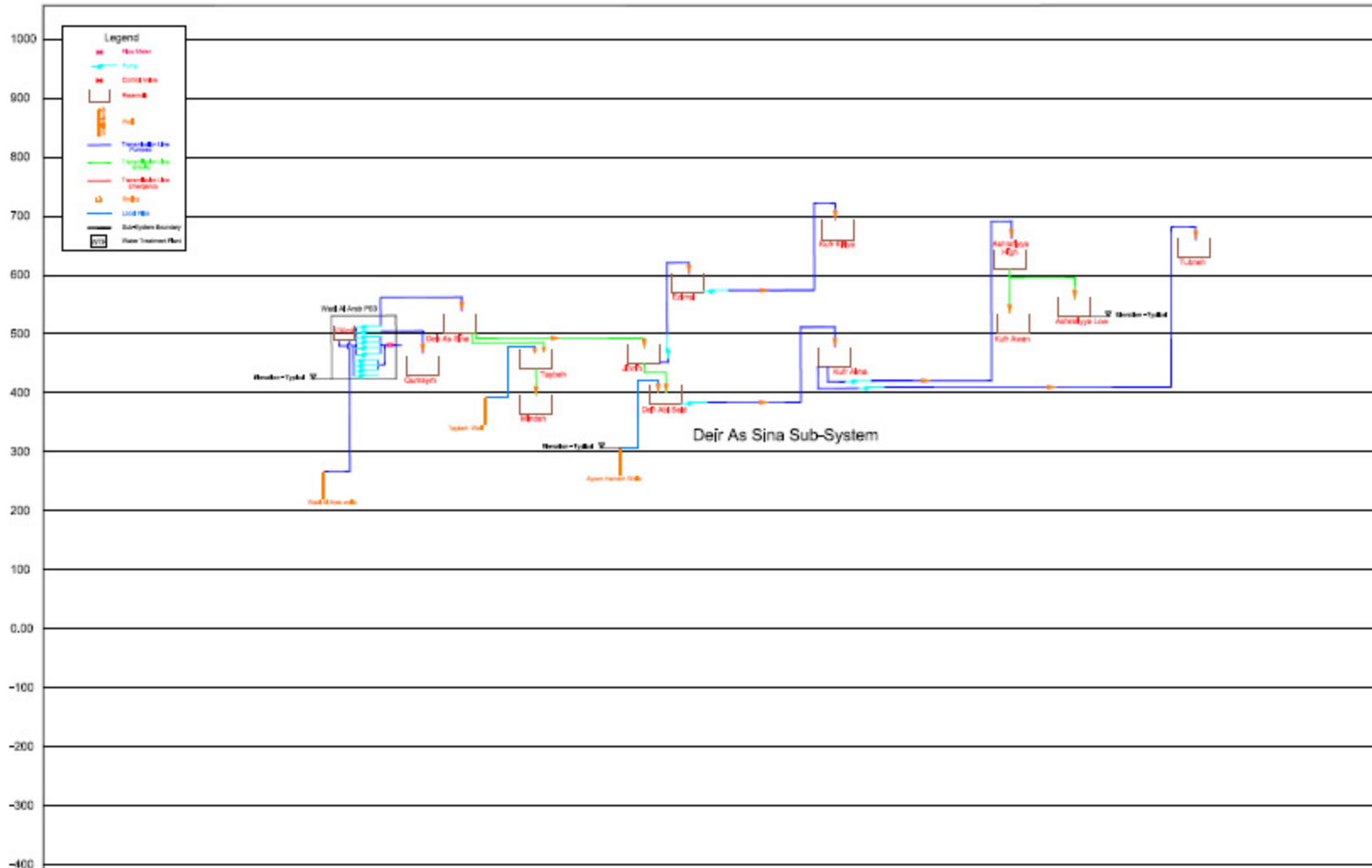
THE HASHEMITE KINGDOM OF JORDAN  
MINISTRY OF WATER AND IRRIGATION  
WATER AUTHORITY

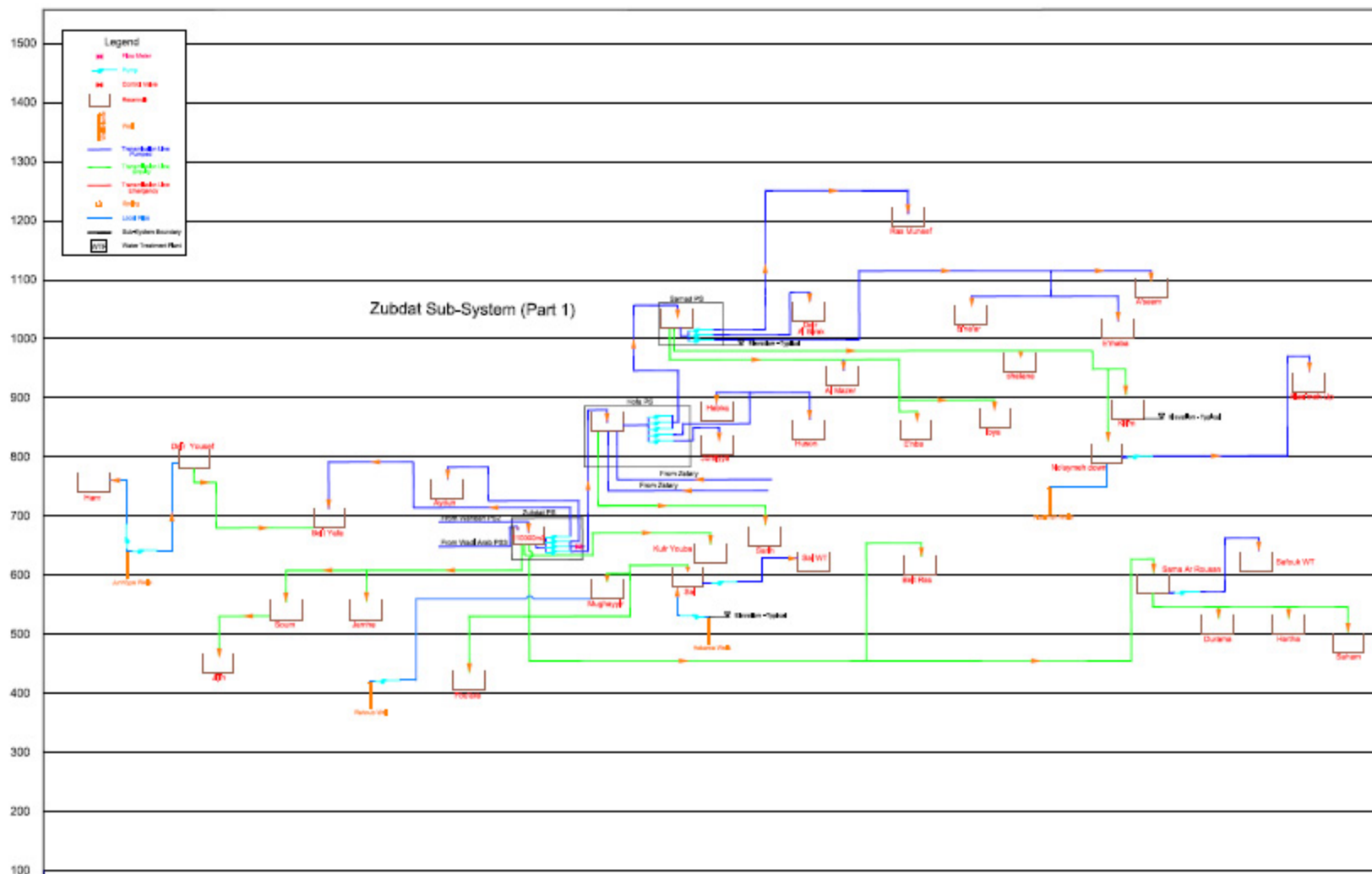


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NORTHERN GOVERNORATES WATER  
TRANSMISSION SYSTEM FEASIBILITY STUDY  
SCHEMATIC PROFILE OF ALTERNATIVE 3  
UM EL-LULU SUB-SYSTEM

PROJECT NO.  
3029-42324  
DRAWING NO.  
7-5-4c





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WATER AUTHORITY

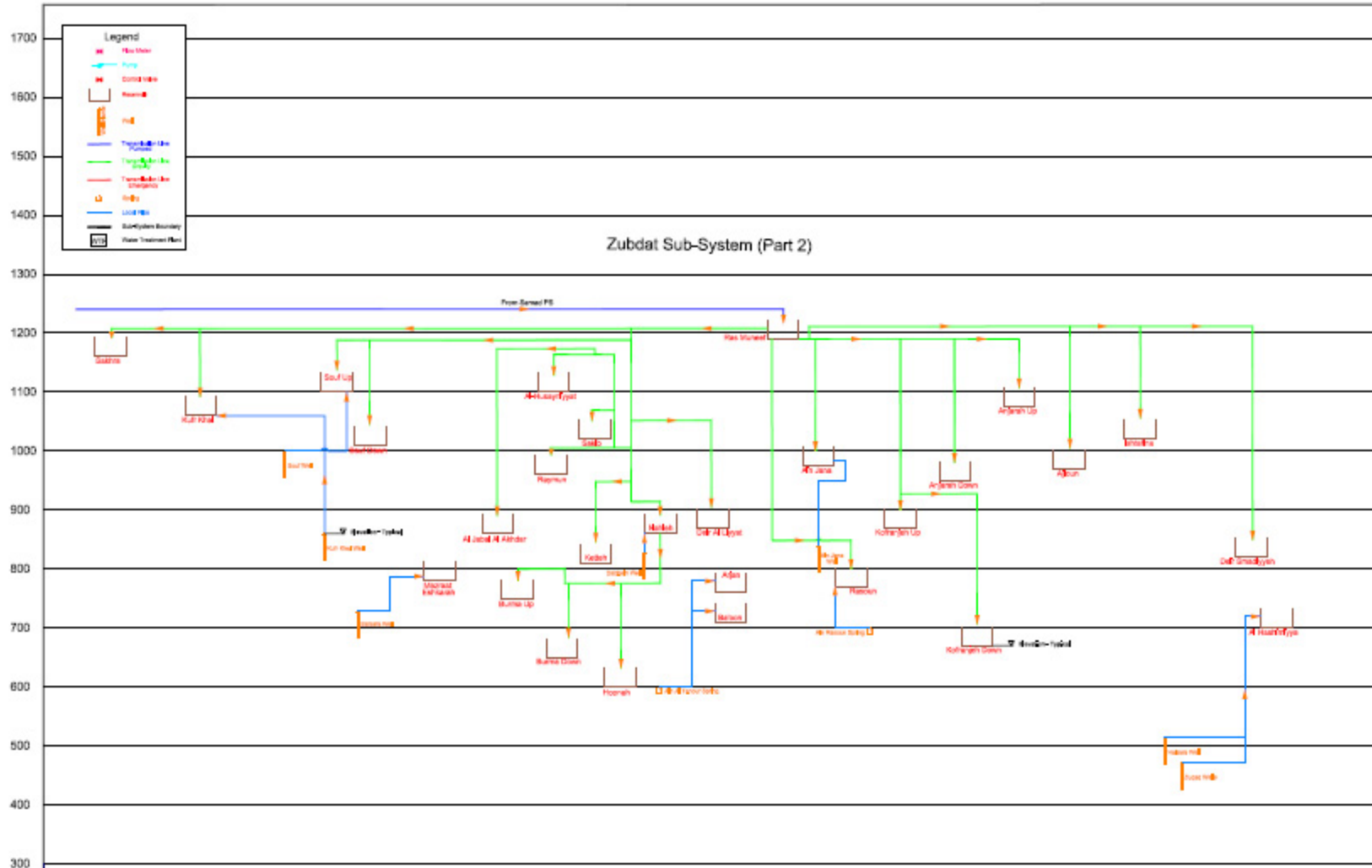


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NORTHERN GOVERNORATES WATER  
TRANSMISSION SYSTEM FEASIBILITY STUDY  
SCHEMATIC PROFILE OF ALTERNATIVE 3  
ZUBDAT SUB-SYSTEM (PART 1)

PROJECT NO.  
3029-42324  
DESIGN NO.  
7-5-4e



## 7.6 Comparison of Alternative Transmission Systems

Refer to Appendix I for details on estimated costs. In this comparison, certain components in common are not included in the total costs shown: water treatment plants, secondary and tertiary distribution, and certain local wells and their pump stations.

**Table 7-6-1: Summary of Facilities Required**

Component	Alternative 1		Alternative 2		Alternative 3	
	Existing	New	Existing	New	Existing	New
<b>Pipelines, Km</b>						
D ≤ 200mm	85.3	204	69.1	205	74.2	232
200 < D ≤ 400mm	41.1	203	59.3	212	54.2	159
400 < D ≤ 600mm	149.5	86.9	139.9	89.5	110.2	85.1
D > 600mm	23	99.5	23	99.5	23	124
<b>Total</b>	<b>298.9</b>	<b>594</b>	<b>291.3</b>	<b>605</b>	<b>261.6</b>	<b>600</b>
<b>Pump Stations, No.</b>						
Existing PS	11		11		11	
New PS	15		16		17	
<b>Total</b>	<b>26</b>		<b>27</b>		<b>28</b>	
<b>Reservoirs</b>						
New Volume, m3	219,900		220,900		201,200	
<b>Number</b>						
V ≤ 1000m3	57		60		67	
1000 < V ≤ 5000m3	57		58		51	
V > 5000m3	11		10		9	
<b>Total</b>	<b>125</b>		<b>128</b>		<b>127</b>	

**Table 7-6-2: Summary of Estimated Costs**

Component	Alternative 1, \$	Alternative 2, \$	Alternative 3, \$
<b>Pump Stations</b>	16,569,472	16,474,797	17,320,650
<b>Reservoirs</b>	48,763,727	49,482,268	46,088,016
<b>Pipe lines</b>	122,103,599	121,910,160	131,272,799
<b>Total Capital Cost, \$</b>	<b>187,436,798</b>	<b>187,867,225</b>	<b>194,681,465</b>
<b>Annual Power Costs</b>	18,646,771	18,805,399	20,382,829

## 7.7 Conclusion

By comparing **Tables 7-6-1 and 7-6-2** above, Alternative 1 is considered to be the preferred option due to the following factors:

1. Lowest annual power cost
2. Lowest capital costs
3. Fewest pump stations (fewest operators)
4. High total reservoir storage (good reliability)
5. Best use of existing pipelines and least total length of required new pipelines.